COMMUNICATION
SUPPORT

HOMEPLUG ADAPTER
STARTER KIT
200 MBPS

FULL ENGLISH MANUAL

NI-707525

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1 INTRODUCTION

The NI-707525 Homeplug Adapter utility program detects 200 Mbps PLC-Ethernet bridge devices in the Homeplug network, measures data rate performance, ensures security of the Homeplug network, and performs diagnostics.

1.1 System Requirements

Operating System	Windows 2000, Windows XP, Windows Vista 32/64 bit, Windows 7?
CPU	Intel Pentium III or higher and clock rate faster than 2.0 GHz are recommended.
RAM	At least 128 MB
Screen Resolution	Any resolution
Free Disk Space	At least 20 MB
Network Interface	At least one fast Ethernet (100 Mbps) network interface card (NIC) and one Ethernet cord

1.2 Package List

- 2 x Homeplug Adapter
- 1 x CD-ROM
- 2 x RJ45 Ethernet cable

2 SAFETY CAUTIONS

This device is used for connection to the AC Homeplug. Before using the device, read the instructions carefully, in order to use the device correctly and safely. For installation instructions, refer to the installation section of this guide.

- Follow all the warnings and instructions marked on the product.
- Before cleaning the device, unplug it from the wall outlet. Use a dry cloth for cleaning. Do not use liquid cleaners or aerosol cleaners.
- Do not place the device near water.
- Do not place the device near or over a radiator or heat register.
- Do not use an extension cord between the device and the AC power source.
- Only professional technicians should service the device. Opening or removing covers may result in exposure to dangerous voltage points or other risks.
- Unplug the device from the wall outlet and refer to professional service personnel for the following conditions:
  - If liquid has been spilled into the product
  - If the device has been exposed to rain or water
  - If the device does not operate normally when following the operation instructions
  - If the device exhibits a distinct change in performance

3 ADAPTER

3.1 Ethernet Interface

Use one end of a network cable to connect the Ethernet interface. Use the other end of the cable to connect the Ethernet interface of the computer or another Ethernet-enabled network device.

3.2 Buttons

Figure 3-1 Side panel

RST: Restore the factory defaults.

NMK: Set the membership state.

- Pressing and holding the **NMK** button for more than 10 seconds randomizes the NMK value.
- Pressing and holding the **NMK** button for more than 3.0 seconds makes the adapter a member of the existing AVLN.
-

3.3 LEDs

There are 3 LEDs on the front panel to indicate the status of the adapter.

Power: Green. It is on when the adapter is powered on.

Ethernet: Green. It blinks to indicate activity over the Ethernet connection.

Data: Green. It blinks to indicate activity over the Homeplug connection.

CODED PHY RATE<30：RED

30<CODED PHY RATE<50：YELLOW

CODED PHY RATE>50：GREEN

The red light and the green light illuminate simultaneously and the indicator is in orange when the device is in reset state.

Figure 3-2 Top view

4 UTILITY INSTALLATION

- Before installing the utility, make sure that no other Homeplug utility is installed in the computer. If any other utility is installed, uninstall it and reboot the computer.
- Insert the CD-ROM of the utility into the CD-ROM driver of the computer. Select **Install Utility,** follow the steps to install the utility program. No password or CD-Key is needed.

The page of utility installation is similar to the one shown in Figure 4-1. Click **Next** to continue.

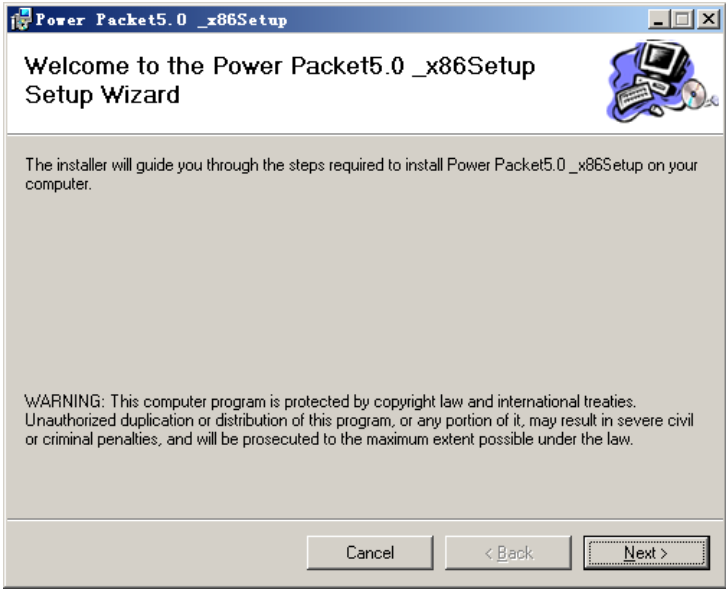
Power Packet5.0 _x86Setup
Welcome to the Power Packet5.0 _x86Setup Setup Wizard
The installer will guide you through the steps required to install Power Packet5.0 _x86Setup on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

Figure 4-1 Setup wizard

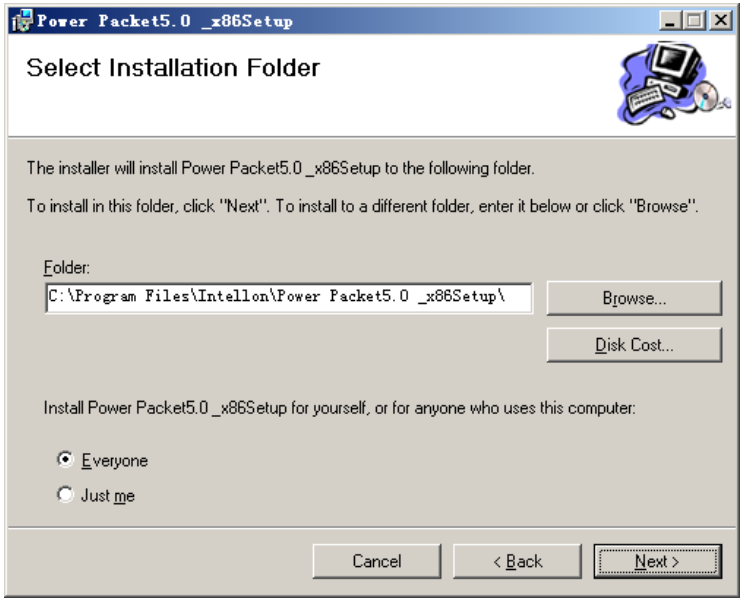
Power Packet5.0 _x86Setup
Select Installation Folder
The installer will install Power Packet5.0 _x86Setup to the following folder.
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
Folder:
C:\Program Files\Intellon\Power Packet5.0 _x86Setup\
Browse...
Disk Cost...
Install Power Packet5.0 _x86Setup for yourself, or for anyone who uses this computer:
Everyone
Just me
Cancel
< Back
Next >

Figure 4-2 Select installation folder

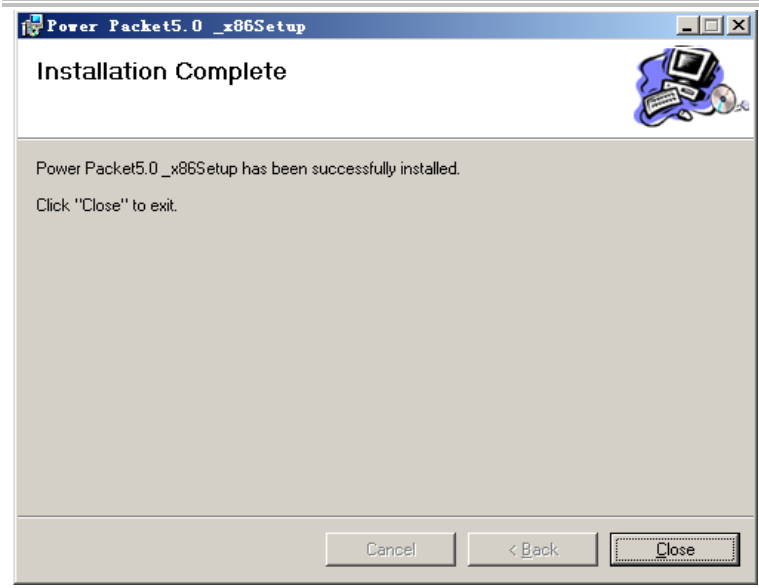

Figure 4-3 Installation complete

Click **Close** to complete the installation.

5 UTILITY SOFTWARE USAGE

5.1 Main Tab

The **Main** screen provides a list of all Homeplug devices logically connected to the computer when the utility is running.

The **top panel** shows local HomePlug devices connected to the network interface card (NIC) of the computer. Click **Connect**. The utility automatically scans the Homeplug periodically for other HomePlug devices when it is connected to the local device. If no local HomePlug device is discovered, the status bar displays **NO HOMEPLUG ADAPTERS DETECTED.**

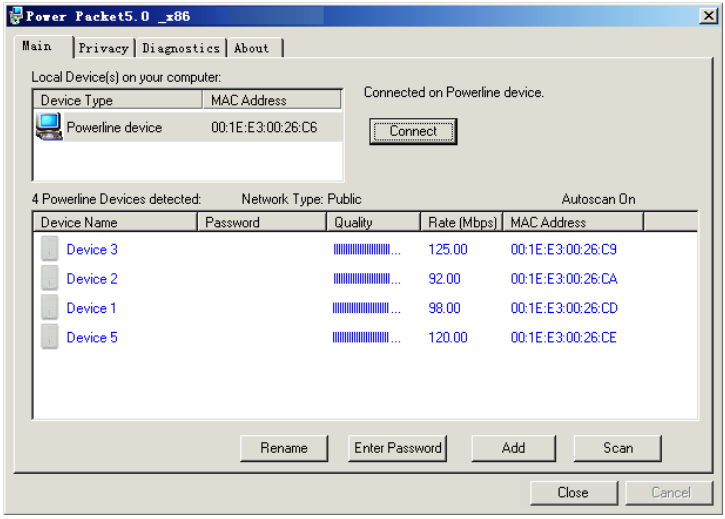

Figure 5-1: Main tab information

The **lower panel** displays all the HomePlug remote devices, which are discovered in the current logical network. The total number of remote devices connected in the same network is displayed above the remote device panel. **Network type** (**Public** or **Private**) depends on the network status of the local device. **Autoscan** shows whether the autoscan function is on. The following information is displayed for all devices that appear in the lower panel.

Device Name

This column shows the default device name, which may be modified. To change the name, click **Rename** or click the name and editing it in the list.

MAC Address

This column shows the MAC addresses of the remote devices.

Password

By default, this column is blank. You can click **Enter Password** to change it. The procedure for setting the password of the device (required when creating a private network) is as follows:

- Click the device name to select the device in the lower panel.
- Click **Enter Password**. A dialog box appears, showing the device name and password. See Figure 5-2.

Figure 5-2: Set device password

- Click **OK** to verify the password. The password field accepts the device password in any case formats, with or without dash.

A confirmation box appears if the password is entered correctly. If a device is not found, a message appears, providing suggestions to solve the common problems. This process takes a few seconds.

Add

This button is used to add a remote device to the existing network by entering the device password of the device. A dialog box appears. See Figure 5-3. You can enter a device name and the password.

If the device is found and the password is entered correctly, a confirmation box appears. If a device is not found, a message appears, providing suggestions to solve the common problems.

Figure 5-3: Add remote device

Note: The device must be in the Homeplug (plugged in), so that you can confirm the password and add the device to the network. If the device is not located, a warning message appears.

Scan

This button is used to perform an immediate search for HomePlug devices connected to the Homeplug network. By default, the utility automatically scans every a few seconds and updates the displayed information.

5.2 Privacy Tab

In the **Privacy** screen, you can maintain security for the logical network and select the device included in the network. See Figure 5-4.

All HomePlug devices are loaded using a default logical network (network name), which is normally **"HomePlug"**. In the **Privacy** screen, you can modify a private network by changing network names and passwords of devices.

Click **Use Default** or enter **HomePlug** as the network name, to reset to the HomePlug network (Public).

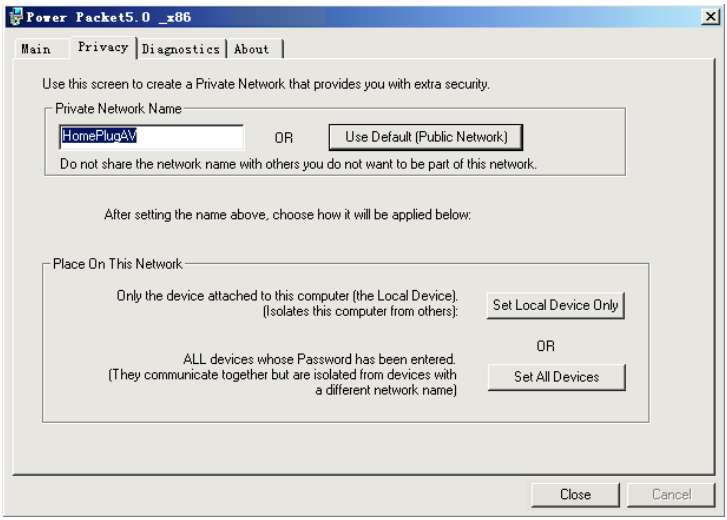
Power Packet5.0 _x86
Main
Privacy
Diagnostics
About
Use this screen to create a Private Network that provides you with extra security.
Private Network Name
HomePlugAV
OR
Use Default (Public Network)
Do not share the network name with others you do not want to be part of this network.
After setting the name above, choose how it will be applied below:
Place On This Network
Only the device attached to this computer (the Local Device).
(Isolates this computer from others):
Set Local Device Only
OR
ALL devices whose Password has been entered.
(They communicate together but are isolated from devices with
a different network name)
Set All Devices
Close
Cancel

Figure 5-4: Privacy screen

Note: If the network name changes to anything other than HomePlug, the network type in the main screen is displayed as ***Private****.*

Set Local Device Only

This button is used to change the network name and password of the local device. If a new network password is entered, all the devices appeared in the Main panel prior to this are no longer present in the new network, effectively making the local devices not to communicate to the devices which are in the old logical network. Click **Set Local Dive Only**, the devices previously set up with the same logical network (same network name) appears in the device list.

Set All Devices

This button is used to change the logical network of all devices that appear in the main panel. If these devices whose passwords have been entered for the same logical network, a dialog box appears, indicating successful operation. For devices whose passwords are not entered, a dialog box appears indicating operation failure.

5.3 Diagnostics Tab

The **Diagnostics** screen shows the system information and history of all remote devices appeared over a period of time. See Figure 5-5.

The **Upper panel** shows technical data concerning software and hardware on the host computer that are used to communicate through HomePlug on the Homeplug network. It includes the following:

- Operating System Platform/Version
- Host Network Name
- User Name
- MAC Address of all NICs (Network interface card) connected to the host
- Identify versions of all Driver DLLs and Libraries used (NDIS) and optionally

- HomePlug chipset manufacturer name (Turbo Only devices)
- MAC Firmware Version (Turbo Only devices)
- MAC addresses of all devices connected locally to the host
- Version of the Configuration Utility
- Vendor name

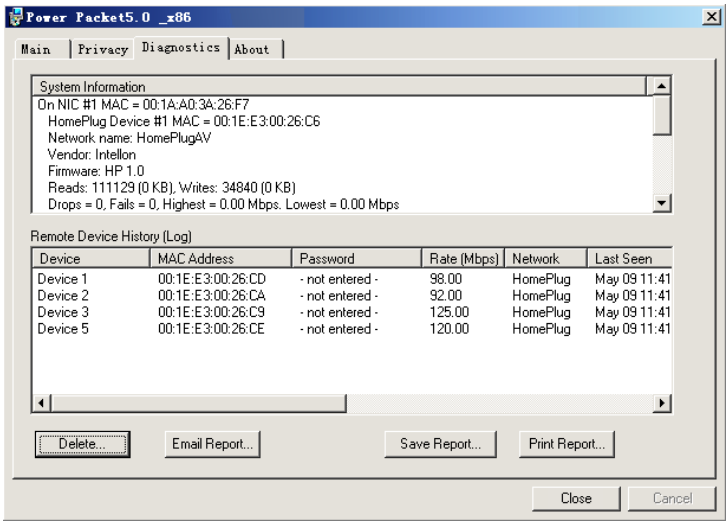

Figure 5-5: Diagnostics screen

The **Lower panel** displays the history of all remote devices appeared on the computer over a certain period of time. All the devices and the parameters of the devices on the Homeplug network are listed. Devices that are active on the current logical network show a transfer rate in the rate column. Devices on other networks, or devices that no longer exist are shown with a "?" in the rate column. The following remote device information is available from the diagnostics screen:

- Device Alias Name
- MAC Address
- Password

- Device Last known rate
- Device Last Known Network name
- HomePlug chipset manufacturer name
- Date device last seen on the network
- MAC Firmware Version

The diagnostics information displayed can be saved to a text file for later use, or be printed for reference for a technical support call. Click **delete** to delete the devices which are no longer part of the network. A dialog window pops up with a confirmation message if the user wants to delete a device whose password has been entered.

5.4 About Tab

The **About** screen shows the software version and provides a html link to a website, such as *www.PowerPacket.com*. Clicking the web address, it enters into the web site.

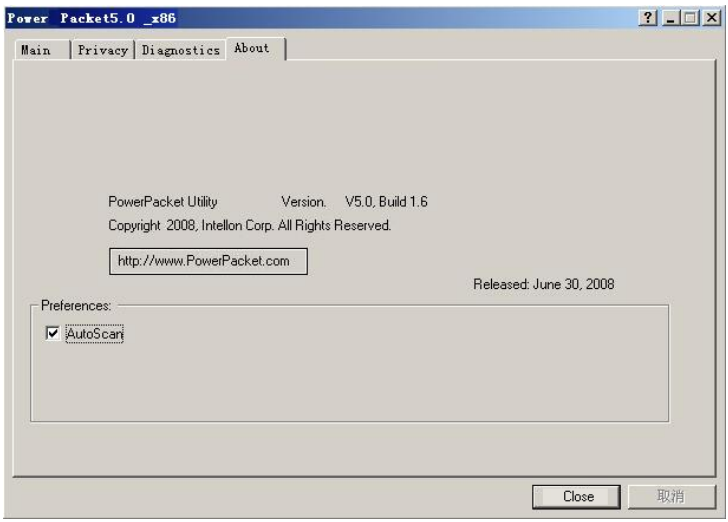

Figure 5-6: About screen

Preferences

The lower part of the panel displays options for turning the autoscan function on or off.

6 NMK PUSHBUTTON USAGE

This section describes how to add new devices or remove old devices from a HomePlug AV logical network (AVLN) by using a NMK pushbutton.

Power LED status indicates the operation progress and result.

6.1 Forming a HomePlug AV Logical Network

When two devices with different NMK values are connected to the same Homeplug, and the user wants them to form a logical network.

1. Press the NMK button on device A for less than 3 seconds.
2. Press the NMK button on device B for less than 3 seconds. The button on B must be pressed within 1 minute
3. Wait for the connection to complete.

The Power LED on both devices blinks evenly at 1-second intervals until the operation succeeds or fails. If the connection succeeds, it illuminates steadily. If an error occurs, the Power LED on the ‘adder’ blinks unevenly until the pushbutton on the ‘adder’ is pressed again or the ‘joiner’ is reset by holding the pushbuttons down for more than 10 seconds.

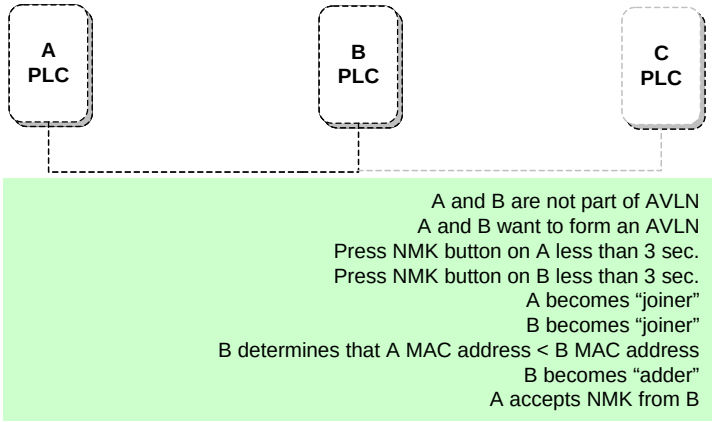
A
PLC
B
PLC
C
PLC
A and B are not part of AVLN
A and B want to form an AVLN
Press NMK button on A less than 3 sec.
Press NMK button on B less than 3 sec.
A becomes “joiner”
B becomes “joiner”
B determines that A MAC address < B MAC address
B becomes “adder”
A accepts NMK from B

Figure 6-1: Forming a HomePlug AV logical network

6.2 Joining a Network

In this scenario a network exists, a new device, the ‘joiner’, wants to join the network. Any device on the existing network can become the ‘adder’.

1. Press the pushbutton on the ‘joiner’ for at least 3 seconds.
2. Press the pushbutton on any network device for less than 3 seconds, making it the ‘adder’. Please press this pushbutton within 1 minute.
3. Wait for the connection to complete.

The Power LED on both devices blinks at 1-second intervals until the process succeeds or fails. It illuminates steadily on success connection. If an error occurs, the Power LED on the ‘adder’ blinks unevenly until the pushbutton on the ‘adder’ is pressed again or the ‘joiner’ is reset by pressing the pushbutton for more than 10 seconds.

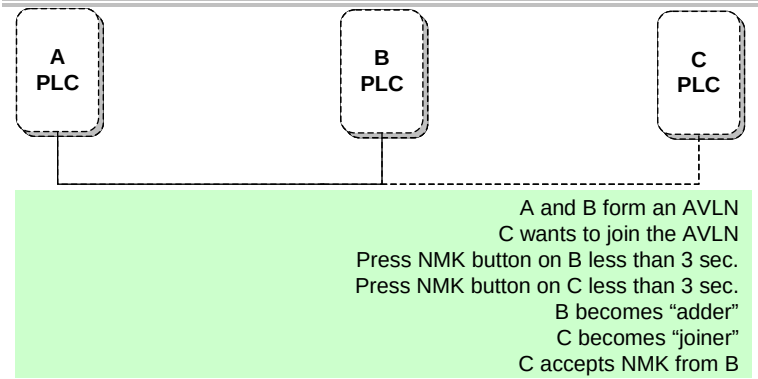

Figure 6-2: Joining a network

6.3 Leaving a Network

A network exists. The user wants to remove one device, the ‘leaver’, from that network. The user wants to remove the device from service altogether or have it join another logical network.

1. Press the pushbutton on the ‘leaver’ for at least 10 seconds. The device resets and restarts with a random NMK.
2. Wait for the reset to complete.

The Power LED on the ‘leaver’ momentarily extinguishes during reset, blinks during restart, then illuminates steadily. No error occurs.

The user can disconnect the device from the medium or join it to another logical network on the same medium when it is completed.

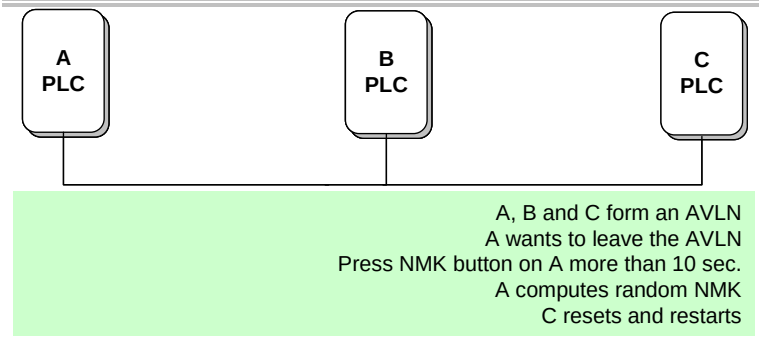

Figure 6-3: leaving a network

Appendix A Specifications

Chipset	Intellon INT6400
Protocol	Compliant with HomePlug AV 1.0 Co-existing with existing HomePlug 1.0
System Support	Windows 98SE, Windows 2000, Windows ME, Windows XP 32/64 bit and Windows Vista 32/64bit
PLC Rate	200 Mbps
Modulation Band	2MHz~30MHz
Modulation Schemes	Support QAM 1024/256/64/16/8, QPSK, BPSK and ROBO
Encryption	128 AES

LED Indicators	Power Ethernet: Ethernet link and activity Data: PLC link and activity
Buttons	RST: Restore the default factory settings NMK: Set up network password automatically
Consumption	5 W
Operating Temperature	0ºC~45ºC
Storage Temperature	-20ºC~70ºC
Operating Humidity	10%~90%, non-condensing
Storage Humidity	5%~90%, non-condensing
Power Supply	100 V~240 V AC, 50Hz~60Hz
Certifications	CE, UL, FCC Part 15 Class B
Green Standard	RoHS
Physical Characteristics	L×W×H: 100 mm × 65 mm × 42 mm
Weight	127 g

Appendix B Acronyms and Abbreviations

AVLN	AV In-home Logical Network, the AVLAN is the set of STAs that possess the same network Membership key, every AVLN is managed by a single CCo
CCo	Central Coordinator, the CCo is a superset of a STA which includes terminal equipment identifiers and global link identifiers
CSMA/CA	Carrier Sense Multiple Access / Collision Avoidance
DAK	Device Access Key
DM	Device Manager
IGMP	Internet Group Management Protocol
NEK	Network Encryption Key
NID	Network ID (Identification)
NMK	Network Membership Key
PLC	Homeplug Communication
PIB	Parameter Information Block
STA	Station, a STA in the network with a connection to the Homeplug and being able to source or sink traffic
TDMA	Time Division Multiple Access
TEI	Terminal Equipment Identifier
TOS	Type of Service
VLAN	Virtual Local Area Network

Appendix C About QoS

PLC 200AV allows 4 levels of Channel Access Priority (CAP (0 – 3)). The 8 levels of VLAN Ethernet tags must be mapped to the 4 levels of CAP priority, where CAP 3 is the highest priority and CAP 0 is the lowest. CAP 3 priority is used for voice and network management frames, CAP 2 is used for streaming video and music while CAP 1 and CAP 0 are used for data.

Default CAP

The Default CAP group allows default priority mapping of packets that do not have a VLAN tag. Settings are available for unicast (directed to a host).

- IGMP - (default CAP 3) - set the channel access priority for IGMP frames - these are the group management frames, not the stream data
- Unicast - (default CAP 1) - set the default channel access priority for unicast frames not matching any other classification or mapping.
- IGMP managed Multicast Stream (Fixed to CAP 2) - set the default channel access priority for stream data belonging to a snooped IGMP multicast group.
- Multicast/Broadcast - set the default CAP for multicast frames not in a snooped group and for broadcast frames.

The following are the factory default settings for VLAN Tags and TOS Bits:

VLAN Tag User priority	Default CAP Priority	TOS Bit User Priority	Default CAP Priority
0	CAP1	0	CAP1
1	CAP0	1	CAP0
2	CAP0	2	CAP0
3	CAP1	3	CAP1
4	CAP2	4	CAP2
5	CAP2	5	CAP2
6	CAP3	6	CAP3
7	CAP3	7	CAP3